



# Installation and Operating instructions

## JUDOMAT softening unit JM 2-6 WZ-E

**Please issue to the owner/operator.  
Read carefully before installation/start-up!  
Subject to change without notice.**



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Operating instructions: JUDOMAT softening unit JM 2-6 WZ-E

In the interests of engineering progress, subject to change without notice!

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1-48



## Contents

<b>1</b>	<b>Introduction .....</b>	<b>6</b>
1.1	Pictograms and their meaning .....	6
1.2	Warranty .....	7
1.3	Operation of the unit .....	7
1.4	Duties of the owner/operator .....	7
<b>2</b>	<b>Transport/Scope of Supply/Storage .....</b>	<b>8</b>
2.1	Consumables .....	9
2.2	Accessories .....	9
<b>3</b>	<b>Product information .....</b>	<b>10</b>
3.1	Manufacturer and type .....	10
3.2	Dimensions .....	11
3.3	Operating data .....	13
3.4	Regeneration performance .....	13
3.5	Scope of application .....	14
3.6	Function .....	14
<b>4</b>	<b>Installation .....</b>	<b>15</b>
4.1	Location requirements .....	15
4.2	Quality of incoming water supply .....	15
4.3	Installation .....	16
4.4	Pour in the filter media .....	17
4.5	Connecting to the water supply .....	18
4.6	Assembly .....	18
4.7	Drain connection .....	18
4.8	Installation example .....	19
<b>5</b>	<b>Electrical connection .....</b>	<b>20</b>
5.1	Optional error report .....	20
5.2	Optional external regeneration control .....	21
<b>6</b>	<b>Description of control unit .....</b>	<b>22</b>
6.1	Data storage .....	22
6.2	Display .....	23
6.2.1	LCD Display .....	23
6.2.2	Control lamp .....	23



6.2.3	Symbols in display .....	24
6.2.4	Display during operation.....	25
6.2.5	Display during regeneration.....	25
<b>7</b>	<b>Programming the control unit.....</b>	<b>26</b>
<b>7.1</b>	<b>Base level .....</b>	<b>27</b>
<b>7.2</b>	<b>Expert level .....</b>	<b>27</b>
7.2.1	P1 Time .....	29
7.2.2	P2 Weekday .....	29
7.2.3	P3 Regeneration time .....	29
7.2.4	P4 Regeneration interval .....	29
7.2.5	P6 Brine values .....	30
7.2.6	P7 Capacity of the unit and P8 Raw water hardness.....	30
7.2.7	P9 Units.....	31
7.2.8	P10 Clock mode .....	31
<b>7.3</b>	<b>Regeneration stages.....</b>	<b>32</b>
7.3.1	Fast forwarding regeneration phases.....	32
7.3.2	Regeneration stop.....	32
7.3.3	Manual Regeneration .....	34
<b>7.4</b>	<b>Process level .....</b>	<b>35</b>
7.4.1	Setting resin volume.....	36
<b>8</b>	<b>Initial commissioning .....</b>	<b>37</b>
<b>8.1</b>	<b>Testing the sodium content.....</b>	<b>37</b>
<b>9</b>	<b>Regeneration intervals.....</b>	<b>38</b>
<b>9.1</b>	<b>Volume of softened water .....</b>	<b>38</b>
<b>9.2</b>	<b>Mixed water volume.....</b>	<b>39</b>
<b>10</b>	<b>Commissioning.....</b>	<b>40</b>
<b>10.1</b>	<b>Settings.....</b>	<b>40</b>
10.1.1	Values required for capacity of the unit (P7) and raw water hardness (P8).....	41
<b>11</b>	<b>Operation.....</b>	<b>42</b>
<b>11.1</b>	<b>Controlling mixed water hardness .....</b>	<b>42</b>
<b>11.2</b>	<b>Salt supply .....</b>	<b>42</b>
<b>12</b>	<b>Errors.....</b>	<b>43</b>
<b>13</b>	<b>Parts.....</b>	<b>44</b>
<b>13.1</b>	<b>JM 2-3 WZ-E.....</b>	<b>44</b>
13.1.1	Parts list.....	45
13.1.2	Spare parts list.....	45
<b>13.2</b>	<b>JM 4-6 WZ-E.....</b>	<b>46</b>
13.2.1	Parts list.....	47
13.2.2	Spare parts list.....	47

<b>14</b>	<b><i>Maintenance and inspection</i></b> .....	<b>48</b>
<b>14.1</b>	<b>Cleaning</b> .....	<b>48</b>
<b>14.2</b>	<b>Unit shutdown</b> .....	<b>48</b>



**EG-Konformitätserklärung**  
Im Sinne der EG-Richtlinie Maschinen 98/37/EG  
und der EG-Richtlinie EMV 89/336/EWG

Hersteller JUDO Wasseraufbereitung GmbH

Anschrift Hohreuschstr. 39-41  
D-71364 Winnenden

Produktbezeichnung: **Wasserenthärtungsanlagen**  
JM 2-6 WZ-E

Fachnorm: Elektromagnetische Verträglichkeit, Fachgrundnormen für  
Störaussendungen und Störfestigkeit  
EN 50 081 Teil 1 und Teil 2  
EN 50 082 Teil 1 und Teil 2

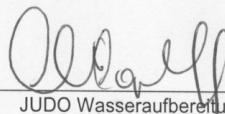
Die Einhaltung der EMV-Anforderungen (CE-Konformität) für den Einsatz des Gerätes im Haushalts-/ Gewerbebereich und im Industriebereich wird hiermit in allen oben genannten Punkten bestätigt.

Harmonisierte Normen: EN 292 Teil 1 und 2 Sicherheit von Maschinen  
EN 60204/DIN VDE 0113 Elektrische Ausrüstung von Maschinen  
EN 60335/DIN VDE 0700 Sicherheit elektrischer Geräte  
Teil 1 für den Hausgebrauch

Aussteller: JUDO Wasseraufbereitung GmbH

Ort, Datum Winnenden, den 04.März 2004

Rechtsverbindliche Unterschrift:



JUDO Wasseraufbereitung GmbH

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien. beinhaltet jedoch keine Zusicherung von Eigenschaften.

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WD 1930263

# 1 Introduction

Thank you for making JUDO your brand of choice. Please take note of, and follow this instruction manual so that you can enjoy your unit for a long time. This instruction manual contains all the information needed for the installation, operation and maintenance of the described unit.

We make every effort to ensure you are a satisfied customer and ask that you contact your local JUDO representative if you have any questions concerning water treatment, e.g. adding further features to your existing system. Please quote the data given on the name plate with all enquiries.

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### 1.1 Pictograms and their meaning

The words **Warning**, **Caution** and **Note**, highlighted in bold with matching pictogram, have the following meaning:



**Warning**

**Risk of injuries and accidents!**



**Caution**

**Risk of malfunctions or damage to the unit!**



**Note**

**A special feature exists!**



## 1.2 Warranty

The warranty, as defined in our General Terms and Conditions of Sale and Delivery, only applies if

- The unit is used according to the explanations in this instruction manual.
- The unit has not been opened or improperly handled in some other way.
- Repairs have been carried out by authorised, qualified employees only.
- Original spare parts only are used for repairs.

## 1.3 Operation of the unit

The softening unit described in this manual is engineered to reduce water hardness within the framework of the application described herein.



### **Warning**

**Other uses are deemed to be undue, non-intended uses and are not allowed. JUDO Wasseraufbereitung GmbH is not liable for any losses whatsoever resulting from these applications!**

## 1.4 Duties of the owner/operator

The owner/operator of the system is responsible for the following:

- Instructing the operating personnel.
- Arranging regular maintenance.



## 2 Transport/Scope of Supply/Storage

### Transport:

- Transport unit carefully and upright, do not throw!

### Scope of supply:

- Salt and brine container.
- Filter vessels with riser tube and lower filter inlet.
- Control unit with central control valve and upper filter inlet.
- Brine tube.
- Drain connection.
- Overflow connection.
- Ion-exchange Resin (pre-installed and in volumes scaled to unit size).
- Installation and operating instructions.



#### **Note**

**Please check the delivered items are complete with respect to your order and are intact!**

**The units are transported and delivered complete and fully assembled!**

**Transport damage must be reported within 24 hours otherwise, for insurance reasons, loss claims cannot be settled!**

### Storage:



#### **Caution**

**Dry, cool storage location!**

**Allowable storage temperature: 4 °C to 40 °C!**





## 2.1 Consumables

Description	Order No.
Regeneration salt tablets	8839101
Total hardness measuring kit type A (measures 0 to 1.68 ppm)	8742119
Total hardness measuring kit type B (measures 0 to 0.112 ppm)	8690013



### Caution

Use high quality salt tablets only. Salt should not be able to be pressed through the container floor. Non-dissolved salt can reduce the unit efficiency and can result in a loss in capacity!



### Note

Consumables are not included in the scope of delivery!

## 2.2 Accessories

Description	Order No.
Automatic mixing valve JAV 1"	8735101
Automatic mixing valve JAV 1¼"	8735202
QUICKSET mounting set JQU 1¼"	8735179
Flexible connection pipe set JAS 1"	8395033
Flexible connection pipe set JAS 1½"	8395034
Salt level indicator JSMA	8390002
Disinfection unit JCLE 3	8395017
Residual hardness supervising unit JRÜ	8735175
Malfunction message unit JSMP 4	8390079
Connecting cable for external control	1500429



### Note

Accessories are not included in the scope of delivery!



## 3 Product information

### 3.1 Manufacturer and type

Manufacturer:

**JUDO-Wasseraufbereitung GmbH**

Hohreuschstraße 39-41

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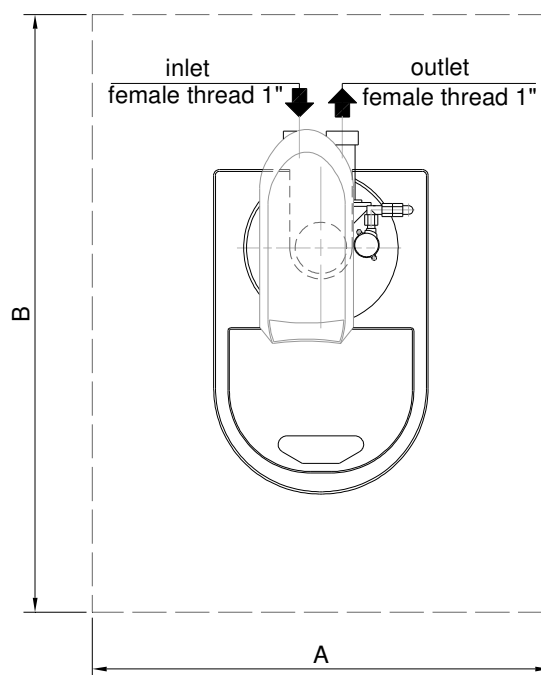
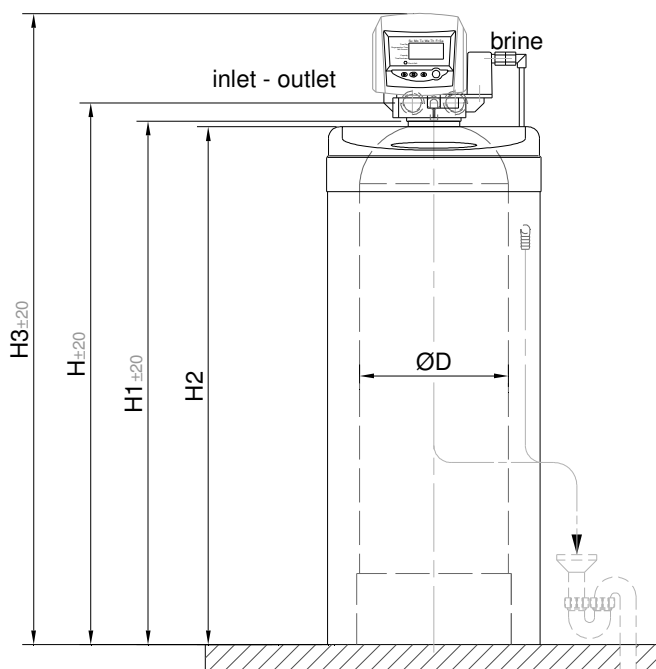
Type:

JUDOMAT softening unit JM 2-6 WZ-E

Model	Order No.
JM 2 WZ-E	8390059
JM 3 WZ-E	8390060
JM 4 WZ-E	8390061
JM 6 WZ-E	8390062



### 3.2 Dimensions



Model	$\varnothing D$	H	H1	H2	H3	A	B	C
JM 2 WZ-E	215	1210	920	910	1109	1250	1200	475
JM 3 WZ-E	260	1210	920	910	1109	1250	1200	475

Dimensions in mm

Date created: 20.05.09

Release date: 05.06.09

Operating instructions: JUDOMAT softening unit JM 2-6 WZ-E

Revision date: 22.06.09

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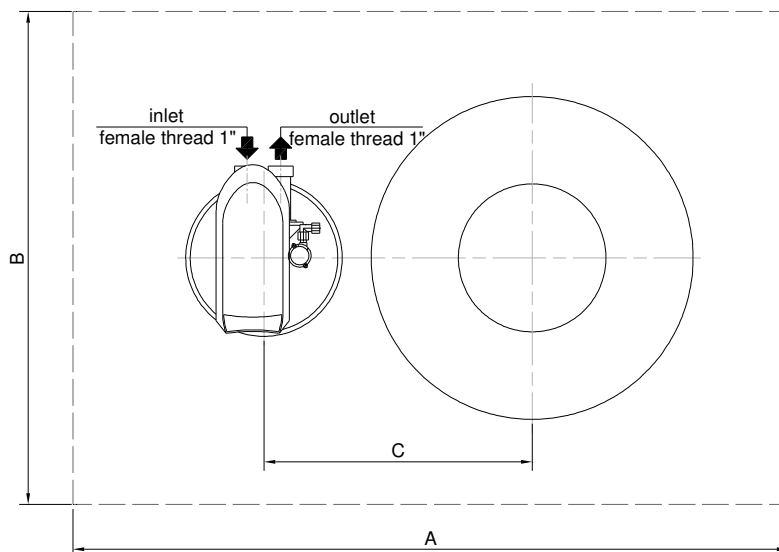
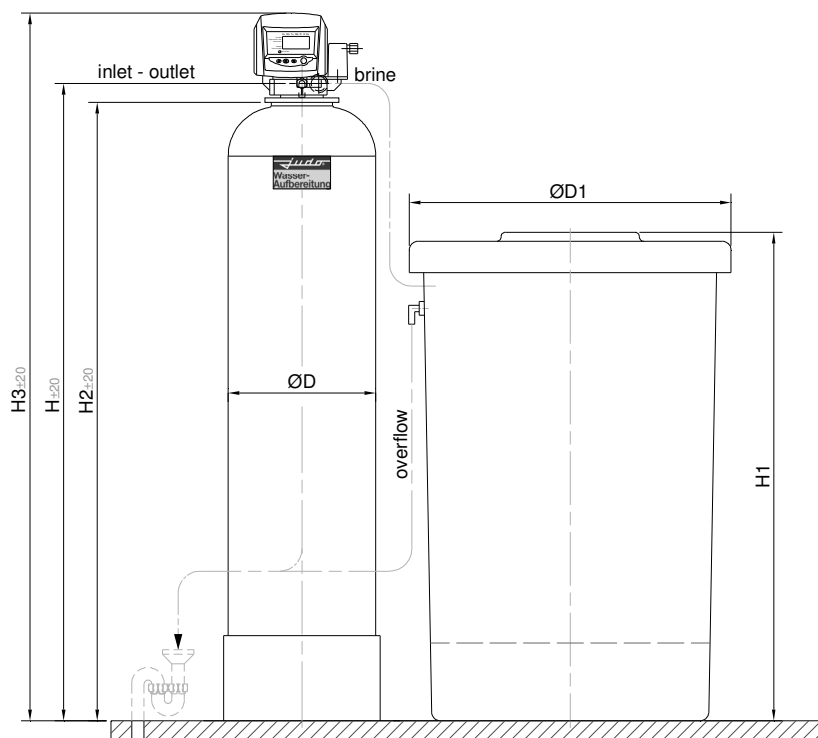
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11-48



Model	ØD	ØD1	H	H1	H2	H3	A	B	C
JM 4 WZ-E	320	540	977	935	1050	1135	1350	1200	500
JM 6 WZ-E	260	720	1422	1380	1090	1580	1250	1600	600

Dimensions in mm

Date created: 20.05.09

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12-48



### 3.3 Operating data

Model JM	2 WZ-E	3 WZ-E	4 WZ-E	6 WZ-E
Max. flow rate [m³/h]	2	3	4	6
Capacity at optimal brine levels [°dHxm³]	60	100	200	300
Salt consumption at optimal brine levels [kg/regeneration]	3,3	5,5	11,0	16,5
Capacity at economy setting [°dHxm³]	45	75	150	225
Salt consumption at economy setting [kg/regeneration]	1,8	3,0	6,0	9,0
Min. operating pressure [bar]	3	3	3	3
Max. operating pressure [bar]	8	8	8	8
Approx. pressure loss at max. flow rate and 12 °C water temperature [bar]	1,2	1,6	1,3	1,9
Pipe connection female thread for softening unit ["]	1	1	1	1
Max. water temperature [°C]	38	38	38	38
Max. ambient temperature [°C]	40	40	40	40
Capacity salt and brine container [litr.]	78	78	200	300
Resin volume [litr.]	20	30	50	75
Electrical consumption control unit [VA]	5	5	5	5
Power supply [VAC/Hz]	230/50	230/50	230/50	230/50

Performance data bases on 4.5 bar pressure.

Max. flow rates may vary according to residual hardness required.

Mixed water values are to be calculated in accordance with actual conditions on site. Data shown here are max. values.

**Conversion:** °dH = sum of alkaline earth (mmol/litr.) x 5,6

### 3.4 Regeneration performance

Optimal brine levels								
Model JM	2 WZ-E		3 WZ-E		4 WZ-E		6 WZ-E	
	Flow rate [litr./min.]	Total flow rate [litr.]	Flow rate [litr./min.]	Total flow rate [litr.]	Flow rate [litr./min.]	Total flow rate [litr.]	Flow rate [litr./min.]	Total flow rate [litr.]
Regeneration stages								
„C1“ back wash 1	7,5	105	12	168	22	308	24	336
„C2“ regeneration media intake	0,8		1,6		1,8		2,4	
„C3“ slow wash	1,5		1,5		1,9		2,4	
„C5“ fast wash 1	7,5	45	12	72	22	132	24	144
„C6“ back wash 2	7,5	7,5	12	12	22	22	24	24
„C7“ fast wash 2	7,5	7,5	12	12	22	22	24	24
„C8“ brine chamber refill	1,5	16,5	1,5	22,5	1,9	57	2,4	108



#### Note

**The values noted above may need adjusting to fit in with actual on-site conditions!**

**No softened water is available during regeneration cycle!**



#### Caution

**Do not set brine value “L” as this could lead to hard water being fed through the unit!**

### 3.5 Scope of application

Our natural water supply contains hardness-forming substances in varying volumes. Softening units are used wherever hard water in itself, or the calcium deposits they cause are disturbing to operational processes, e.g. in boiler water, cooling water, air conditioning pre-treatment or in industrial water treatment to name but a few.

### 3.6 Function

JUDOMAT softening units operate on the ion exchange principle. During this process, hardness forming calcium and magnesium ions present in the incoming water supply are replaced with sodium ions. The total salt content balance in the water is thus maintained. The JUDOMAT softening unit consists of a pressure resistant container filled with cation exchange resin, a brine and salt container, a water meter for the flow control regeneration monitoring and a control head with central control valve and upper injector.

The volume of resin in the unit can only soften a given quantity of incoming hard water (volumes depend on incoming water hardness). After this volume the resin is exhausted and needs to be regenerated. The regeneration is started up by the control head automatically.

During regeneration a volume of brine concentrate is fed through the resin chamber in the unit. Calcium and magnesium ions on the resin surface are displaced by the abundance of sodium ions and removed from the system when flushed. Once this process is completed, the full softening capacity of the unit is restored and water softening re-commences.



## 4 Installation



### Caution

**In case of seepage on the water inlet or the unit itself, the water supply should be shut off when operating staff are not present!**

### 4.1 Location requirements

This JUDOMAT softening unit should be installed in a dry and frost-free place. A drain in accordance with plumbing code requirements valid in the country of use must be available for regeneration water flushing. A power supply (230V AC/ 50 Hz) should be available in the immediate vicinity of the unit.



### Caution

**All plumbing and electrical work involved with the installation of this unit should be carried out by persons qualified to do so. Please ensure when installing or working on this unit that all regulations governing plumbing and electrical work as well as general health and safety valid in the country of use are adhered to at all times!**

### 4.2 Quality of incoming water supply

The water to be softened must be clear, free of sediment content and of iron and manganese content.



### 4.3 Installation

- This JUDOMAT unit can be installed in horizontally or vertically running pipes.
- Do not install the unit on suction lines.
- To facilitate operation and maintenance, the unit should be installed at a point with ease of access.
- Operational data shown in this manual must be adhered to. Failure to do so may result in hard water being passed through the system.
- Check brine and salt container for impurities upon receipt. If necessary clean before use. Do not add salt until installation.
- Install filter and brine/salt container vertically on a level surface.
- Where an additional mixing valve is being installed, please observe the installation instructions enclosed therein.
- This JUDOMAT should be installed free from distortion.
- Tubing for fill and flush water as well as the overflow safety must be connected to the drain and need free-flow access. Do not shorten tubing!
- Please ensure that all regulations governing plumbing work and safety valid in the country of use are adhered to at all times.
- Adjust the max. flow rate according to the actual raw water hardness, alt. residual hardness required on site (e.g. installing a throttling device or flow meter).
- Do not install any sharp bends or pipe reducers immediately after the flow meter.
- External fusing for the power supply, max. 10A.
- Do not install the control unit under leaking pipes.
- Installation of the unit in front of the water meter on a public water supply only in countries where such installation is permitted.
- All rules, statutes and regulations governing installation and valid in the country of use must be observed and adhered to at all times.

Solutions to problems and other installation options can be clarified by JUDO's technical advisers.





#### 4.4 Pour in the filter media



##### Note

**Always comply with the safety regulations for filter media valid in country of use!**

**Fill resin container BEFORE connecting to water supply!**

1. Place resin container at point of use.
2. Fill resin container to approx.  $\frac{1}{3}$  with water. Cover opening of injector unit (e.g. with duct tape).
3. Place injector unit centrally in the resin container.
4. Fill filter media into resin container up to levels required (see chapter 3.3).



##### Caution

**No filter media should overflow out of the container. All filter media should be added into the resin container!**

5. Clean any resin off of threading on resin container and remove covering of injection unit.
6. Place central control head with upper injector and O-ring on injection unit and screw onto resin container until sealed.



##### Caution

**The control head should be tightened at max. 27 Nm (hand-screwed). Tighter may lead to damage to the valve or resin container!**

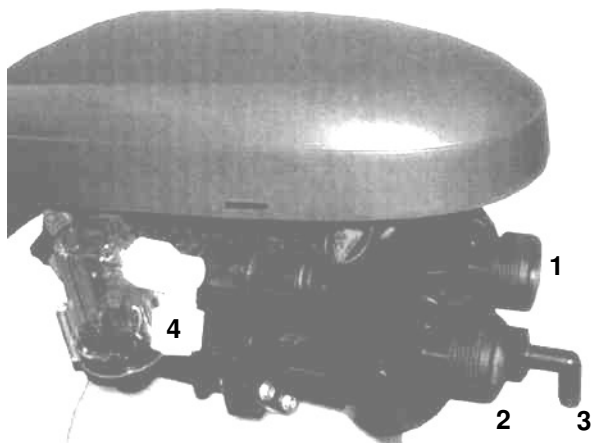


#### 4.5 Connecting to the water supply



##### Note

**The connection unit is fitted with an arrow indicating flow direction!**



##### Legend:

- 1 = Hard water inlet
- 2 = Softened water outlet
- 3 = Backwash water flush (drain)
- 4 = Brine container connection

#### 4.6 Assembly

1. Place unit container on a level surface.
2. Connect the softener unit to the water supply.
3. Place brine/salt container on a level surface in front of the unit.
4. Check brine valve is sitting properly and adjust if required.
5. Connect brine tube to brine container and control head.
6. Connect unit to power supply.



##### Note

**Salt tablets should not be added to the brine container before commissioning!**

#### 4.7 Drain connection

Tubing provided for backwash water and overflow safety must be fed to the drain at a constant, downward gradient. Access to the drain must be provided above ground level. Do not feed the drainage tubing across the upper part of the unit. Fix the lower, free end of the tubing to the drain.



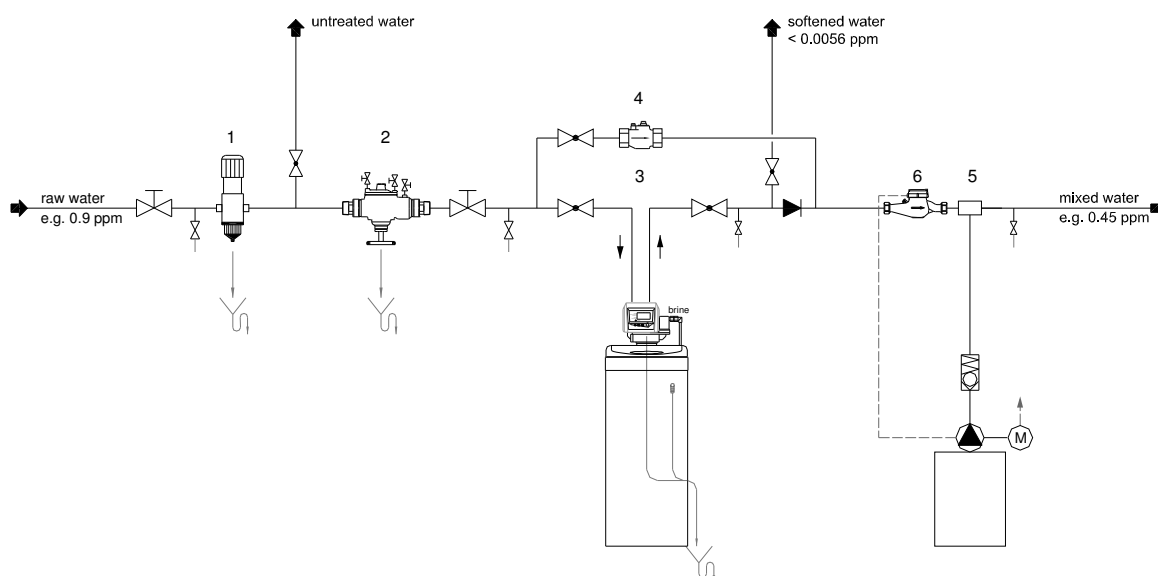
## 4.8 Installation example



### Note

**In cases where varying degrees of residual hardness are required, additional mixing valves and back flow preventers will have to be installed. Taps should be installed in front of and after the unit for measuring purposes!**

Where fully softened water is to be generated (0 ppm), piping used should be of PVC or other corrosion resistant materials. Where the water generated is only partially softened (approx. 0.5 ppm) copper or galvanised pipes may be used. We recommend, however, that a pump be installed after the unit dosing corrosion protection minerals in proportion to the mixed water flow rate.



- 1 JUDO protective filter
- 2 JUDO pipe separator JRT-BA
- 3 JUDOMAT softening unit JM 2 - 3 WZ-E
- 4 JUDO automatic mixing unit JAV
- 5 JUDO WADOS dosing system
- 6 JUDO water meter



## 5 Electrical connection

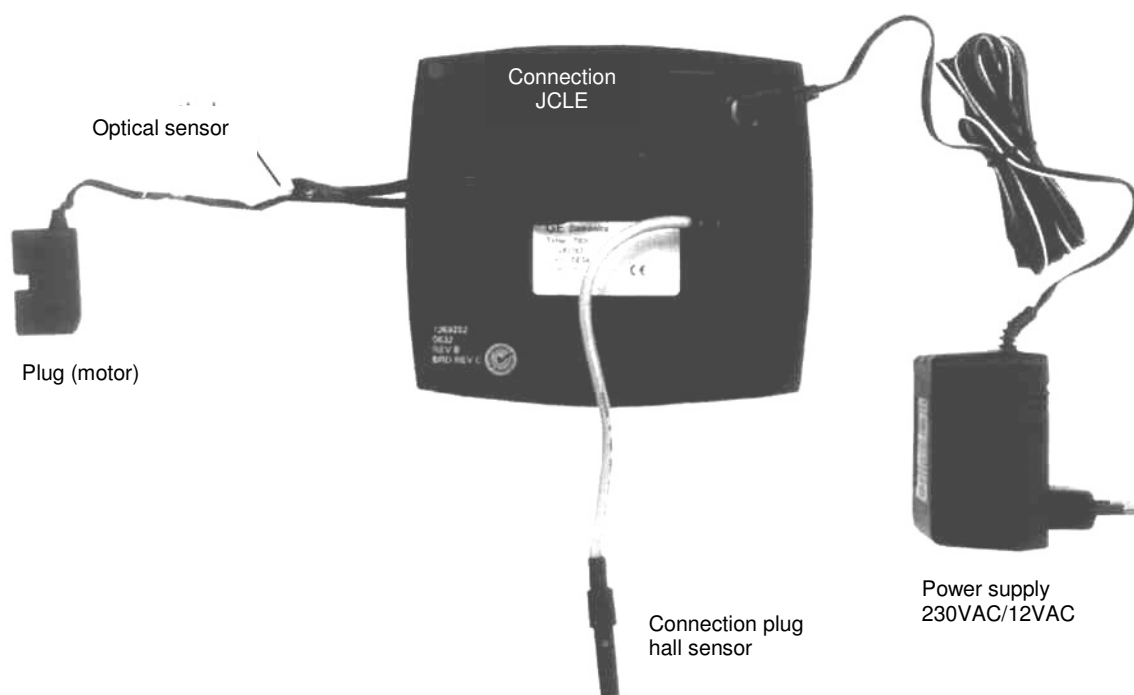


### Caution

**All electrical work should be carried out by a qualified person. Please ensure that all rules, statutes and regulations governing electrical work and health and safety in the country of use are adhered to at all times!**

**Please see the wiring plan enclosed in order to ensure this unit is connected correctly!**

This unit is delivered ex factory with the control head electronic already pre-set so that merely the supplied plug (230VAC/12VAC) needs to be connected to the power supply on site.



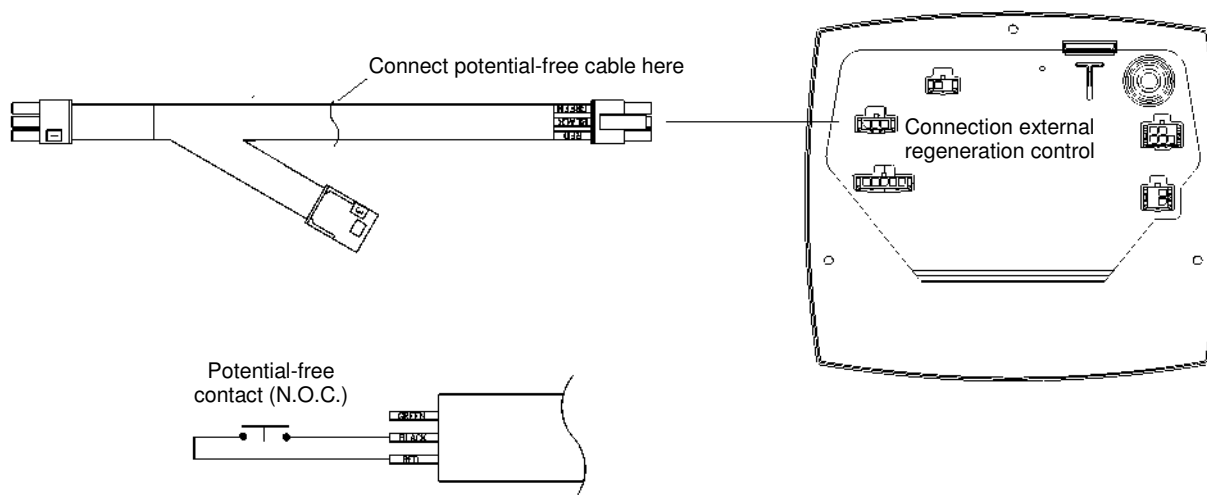
### 5.1 Optional error report

This unit is also available with an optional error report feature offering a potential-free contact (max. 24V) which allows a remote call up of error reports. Errors are also visually displayed on the unit by means of an LED unit. Installation of these features are to be found on the installation manuals provided with these features.



## 5.2 Optional external regeneration control

The control unit includes a potential-free contact which can be used for external regeneration start-up. This can be connected to an external control from which a regeneration start-up impulse can be started. Systems which can be used here include; PLC controls, filter differential pressure controls, manual switches, further unit control connections and independent time switches. Connect a 3-pin wire harness to the 3-pin connection on the reverse of the control unit. The remaining end can be connected to the external control unit using a terminal block. Contact must be made using the black and red cores.



### Connection external regeneration control

A regeneration is activated as soon as a signal is received via the potential-free contact connecting to the control unit and maintaining for 60 seconds. The regeneration is carried out within the framework of the parameters set. During regeneration all incoming signals via the potential-free contact are ignored.



## 6 Description of control unit

This softening unit is equipped with a fully automatic, flow rate operated control unit. This means that regeneration is started once a given volume of incoming water has passed through the system. The time intervals between two given regenerations are determined by the size of the softening unit concerned and the hardness of the incoming water on site.

### 6.1 Data storage

In the even of power failure, data required for the operation of this unit is stored in the data base. This information includes, resin volume, brine concentration, regeneration times and intervals (in days). Where a power failure lasts for longer than 8 hours, the clock and day features will need to be re-programmed.



#### Note

**In order to ensure that the clock and day features are stored for 8 hours, the unit needs to be connected to the power supply for at least 24hrs. to ensure the back-up is fully charged!**



## 6.2 Display



Display

### Legend:

1. 4-digit LCD-Display
2. Control lamp "check salt level" (check)
3. "Down" key
4. "Ok" key
5. "UP" key
6. **Regeneration key (manual)**



### Caution

**The manual regeneration key should be used by the service personnel during commissioning or maintenance only!  
Misuse may result in unit malfunction!**

### 6.2.1 LCD Display

The 4-digit LCD displays information concerning unit operation such as time, volume of treated water available (in m<sup>3</sup>), time of next scheduled regeneration as well as the several regeneration steps and any error reports.

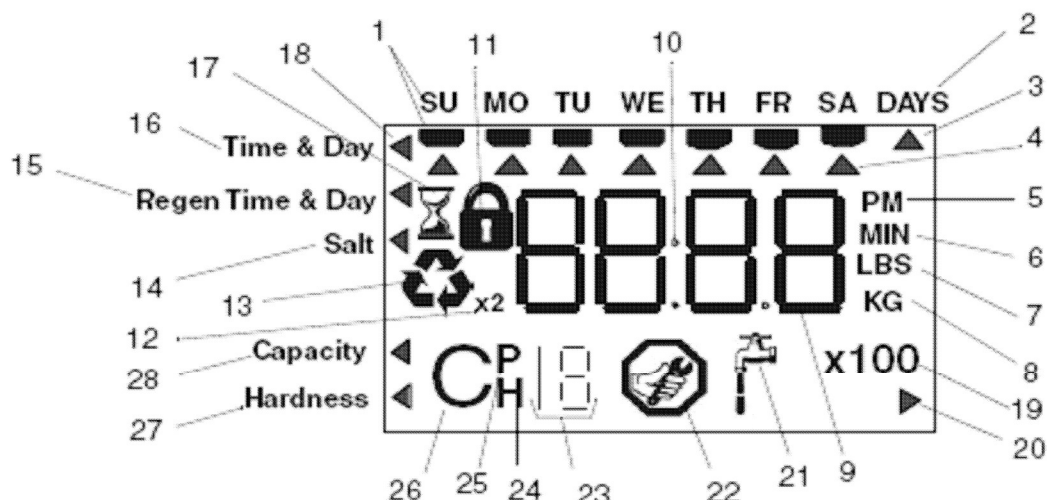
### 6.2.2 Control lamp

The red LED control lamp is located under the LCD display at the left corner and has the following function:

The control lamp lights up when there is no, or too little, conductivity of the brine in the brine container. When salt is added, the conductivity of the brine is increased and the control lamp switches off. This lamp is only active in combination with the disinfection unit (see chapter 2.2).



### 6.2.3 Symbols in display



1. The weekday on which regeneration is programmed is underscored (7 day time control).
2. See 3.
3. Illuminates when regeneration interval is programmed.
4. Indicates which day(s) are programmed.
5. "PM" indicated times between Midday and Midnight ("AM" is not shown). This function is inactive when clock is set to 24-hr. mode. "g/l" indicates values in grams/Litres.
6. "MIN" indicates values stored in minutes.
7. "LBS" indicates value stored in pounds.
8. "kg" indicates values stored in kilograms.
9. 4 digit entries are available for time, values to be entered or error reports.
10. The blinking colon between hours and minutes in clock mode is normal and indicates that the unit is operational.
11. Blocking sign: When programming on level I, this symbol indicates which parameters cannot be altered. In level II, this symbol indicates which parameters are blocked at level I (Ⓛ symbol flashes).
12. "x2" indicates that a second regeneration is required.
13. The recycling symbol flashes when regeneration is required at the next programmed time. Symbol stays on during actual regeneration.
14. The "Salt" symbol lights up when brine is fed into the system.
15. The symbol "REGEN TIME & DAY" lights up when regeneration day and time are being programmed into the unit.
16. The "DAY & TIME" symbol lights up in clock mode when actual day and time are being entered.





17. The 'hour glass' symbol lights up indicating the motor is on and the camshaft is in motion.
18. This symbol appears next to the function currently on display.
19. X100: Multiplication for higher values.
20. No current function allocated.
21. Indicates when water is running through control valve (flow control).
22. No current function allocated.
23. Indicates values or ongoing numbering in combination with fields 24, 25 or 26.
24. Process flow: Number in field 23 indicates which value in the process flow is displayed.
25. Parameters: Only active at level II. Number in field 23 indicated which parameters are displayed.
26. Phase: Number in field 23 indicates actual phase in regeneration cycle.
27. Raw water hardness.
28. Capacity: indicates approx. system capacity.

#### 6.2.4 Display during operation

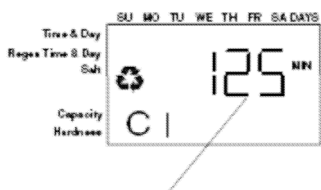
In operational mode, the display alternates between the residual capacity of the unit (mark ◀ indicates capacity) and actual time (mark ▶ indicates weekday).



#### Note

**Depending on the settings for parameter "P9", flow rates will be indicated either in Litres/min (P9=1) or gallons/min (P9=0)!**  
**The "Flow rate" symbol is on even when flow rate is zero!**

#### 6.2.5 Display during regeneration



Residual duration of regeneration

Regeneration can be started manually or automatically. During regeneration, the remaining time is displayed. The phase in regeneration is displayed in the lower left corner (e.g. "C1").



## 7 Programming the control unit

The control unit menu has 4 individual levels.

### **Level 1, base level:**

Easily accessible for entry of base data such as time, day, regeneration time, regeneration interval, brine levels in as far as this data is not blocked at level II.

### **Level 2, expert level:**

All parameters required for the efficient operation of the unit are entered here. Values stored can be blocked. Values blocked can be viewed but not altered at base level.

### **Level 3, regeneration level:**

Times for the individual regeneration phases are displayed here. The steps of the regeneration cycle are only shown but can not be altered. The correct settings are calculated automatically by the control unit referring to the brine value and resin volume.

### **Level 4, process level:**

Information stored at this level is intended for maintenance work, fault finding and contains general information regarding unit performance such as water consumption, days since last regeneration and current flow rate.



#### **Caution**

**Programming should be carried out by trained and qualified personnel only!  
Alterations in programming may lead to unit malfunctions!**



#### **Note**

**Unit automatically leaves programming mode when no key has been pressed for 30 seconds!**

**Press the regeneration key to quit program mode!**

**Parameters can not be altered during a regeneration cycle!**



## 7.1 Base level

Parameters including time, weekday, regeneration time, regeneration interval, brine levels, system capacity and raw water hardness can be entered here without having to access expert level.

### Accessing base level:

Action	Key	Duration	Display
Enter data mode	Ok	Short	Value of parameter
Move to previous or next parameter	Up or Down	Short	Previous or next parameter
Choose parameter	Ok	Short	Value of parameter flashes
Alter value	Up or Down	Short	Reduce or increase value
Store altered value	Ok	Short	Next parameter



### Note

**Once the raw water hardness value has been stored at this level, the unit can be returned to operational mode by pressing the OK key!**

**The system automatically returns to operational mode once the Regeneration key is pressed!**

**Changes to the brine concentration values will affect the unit capacity levels!**

**Changes here will require alteration to the capacity values stored (see chapter 10.1.1)!**

## 7.2 Expert level

This level governs programming for all parameters required for the correct function of the softening unit. Individual parameters can be blocked at this level to ensure they cannot be altered by mistake at level I. These parameters are then marked with a lock symbol ( ). When Expert level is active a **P** appears in the bottom left hand corner of the display. Next to the **P** the number of the parameter in use is displayed.


### Accessing expert level:

Action	Key	Duration	Display
Enter data mode	Up and Down	5 sec.	Value for P1
Move to previous or next parameter	Up or Down	Short	Previous or next parameter
Choose parameter	Ok	Short	Value of parameter flashes
Alter value	Up or Down	Short	Reduce or increase value
Store altered value	Ok	Short	Next parameter
Block parameter	Regen	Short	Lock symbol appears
Unblock parameter	Regen	Short	Lock symbol disappears



## Blocking/unblocking



To block or unblock values select parameter required and store using the Regen key. The lock symbol (  ) appears or disappears. Values are locked at this level when the lock symbol flashes.



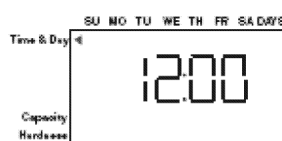
### Note

**We recommend blocking parameters “P3 - P10” at this level in order to prevent them being altered in error at base level!**

Parameter	Description	Area	Unit	Note
P1	Time	00:00-23:59		Dependent on “P9/P10”
P2	Weekday	SU-SA	Days	
P3	Regeneration time	00:00-23:59		Dependent on user
P4	Regeneration interval	0-99	Days	Dependent on user
P6	Brine values	H S L		Brine value optimal Brine value economy Caution: Do not set brine value “L” as this could lead to hard water being fed through the unit!
P7	Capacity of the unit	0.1-90.0	kg CaCO <sub>3</sub>	Dependent on values on site (see chapter 10.1.1)
P8	Raw water hardness	30-2000	mg/l CaCO <sub>3</sub>	
P9	Units	0-1	English metric	0=English 1=metric
P10	Clock mode	0-1	Hours	0=12hr 1=24hr

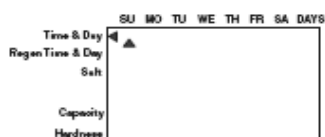


### 7.2.1 P1 Time



The current time is set using parameter P1 (mark ◀ indicates Time/Day). When the time symbol flashes, use the Up/Down keys (↑/↓) to set time required and confirm using Ok (■).

### 7.2.2 P2 Weekday



The weekday is set using parameter P2 (mark ◀ indicates Time/Day). To set the day, press Ok (■). The mark (▲) begins flashing. Use the Up/Down keys (↑/↓) to set day required and confirm using Ok (■).

### 7.2.3 P3 Regeneration time



Regeneration time is set using the parameter P3 (mark ◀ indicates Regeneration/timing). Press Ok (■). The display starts to flash. Use the Up/Down keys (↑/↓) to set time required and confirm using Ok (■).



#### Note

**The unit does not recognise summer/winter times!**

### 7.2.4 P4 Regeneration interval



When set at 0.5 days, regeneration takes place at time set and then automatically 12 hours later. For example, the unit regenerates at 2 am and then again at 2 pm.

The regeneration interval is set using parameter P4 (mark ▲ indicates days). Press Ok (■). The display starts to flash. Set the interval required using the Up/Down keys (↑/↓) and confirm using Ok (■).

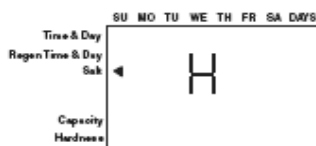


#### Note

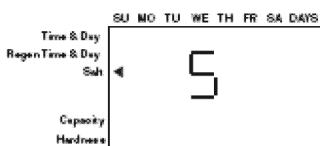
**When using the potential free connection for remote activation, the value here must be set to 'ZERO'!**



## 7.2.5 P6 Brine values



The control unit automatically calculates the system's capacity by multiplying the volume of resin with the brine levels entered here. There is no need to add salt tablets at this time.



Values are entered here using parameter P6 (mark ◀ indicates salt). Press Ok (■). The display starts to flash. Use the Up/Down keys (▲/▼) to set level required and confirm using Ok (■). Options available are optimal (H) and economy (S) brine levels.



### Caution

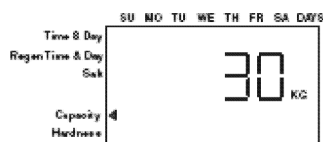
**Do not set brine value "L" as this could lead to hard water being fed through the unit!**



### Note

**The capacity of the system must be adjusted manually when the brine value was altered!**

## 7.2.6 P7 Capacity of the unit and P8 Raw water hardness



The system capacity is shown in kg CaCO<sub>3</sub> capable of being removed by a fully regenerated resin bed. The values used are based on regulations dictated by the water treatment industry. The system capacity function is designed as a help for the installer in setting regeneration intervals and can be modified for an optimal unit function. The system capacity in kg CaCO<sub>3</sub> is entered using parameter P7 (mark ◀ indicates capacity). Press Ok (■). The display starts to flash. Use the Up/Down keys (▲/▼) to set values and confirm using Ok (■).



### Note

**The unit capacity results from the calculation of resin volume and brine levels. Changing the brine level at any point will result in the need to reprogram the unit capacity values!**

**When setting capacity values, it is important to consider the raw water hardness levels on site (see chapter 10.1.1)!**



The raw water hardness is shown in ppm  $\text{CaCO}_3$  and must be adjusted to meet actual values on site. The raw water hardness is entered using parameter P8 (mark ◀ indicates hardness). Press Ok (■). The display starts to flash. Use the Up/Down keys (▲/▼) to set values and confirm with Ok (■).

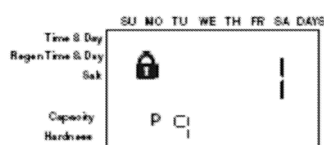


### Note

**Values entered can not be calculated on a linear base and entries are only possible in groups of 10!**

**Changes in the raw water hardness values will result in the need to reprogram unit capacity values (see chapter 10.1.1)!**

## 7.2.7 P9 Units

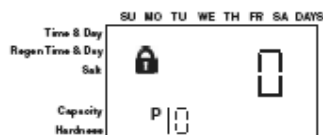


The units of measurement are set automatically as the unit recognises the voltage used. However, it is advisable to check that the unit taken is correct. Value 0 = English, Value 1 = metric.

Values can be adjusted using parameter P9. Press Ok (■).

The display starts to flash. Use the Up/Down keys (▲/▼) to alter values and confirm using Ok (■).

## 7.2.8 P10 Clock mode



The clock is set automatically as the unit recognises the voltage used and sets the time to a 12 or 24 hour setting accordingly. However, it is advisable to check the unit taken is correct.

Value 0 = 12 hour display, Value 1 = 24 hour display.

Values can be assigned using parameter P9. Press Ok (■). The display flashes. Use the Up/Down keys (▲/▼) to set values required and confirm using Ok (■).



## 7.3 Regeneration stages

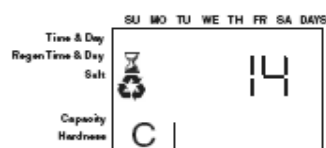
Parameter	Description
C1	Back wash 1
C2	Regeneration media intake
C3	Slow wash
C4	Pause
C5	Fast rinse 1
C6	Back wash 2
C7	Fast rinse 2
C8	Brine chamber refill



### Note

The regeneration phases are not alterable as they are calculated by the control unit based on data of parameter “P6” and “H0” (see chapter 10.1)! Should one of these values be altered, the unit automatically calculates new cycle times!

### 7.3.1 Fast forwarding regeneration phases



Hold Ok (■) down. Display shows current phase (e.g. “C1”) and remaining run time. Hold Ok (■) down and press parallel the Up key (↑) to jump to next phase. The hour glass is displayed whilst the motor is running. Repeat process until the unit returns to production mode (processing softened water).

Action	Key	Duration	Display
Display regeneration step	Ok	Hold down	Cx
Residual regeneration time	Ok	Hold down	Time
Move to next step	Ok and UP	Hold down	Cx

### 7.3.2 Regeneration stop

Press Ok (■) and Up key (↑) down together until the hour glass starts blinking (approx. 5 sec.) Regeneration is interrupted. The camshaft moves back into ‘production’ position (this can take up to 2 min.) The hour glass flashes whilst motor is running.

Action	Key	Duration	Display
Regeneration stop	Ok and Up	5 sec.	Hour glass starts flashing





### Note

Where 2 regenerations have been programmed (display indicates x2), each one must be interrupted individually!



### Caution

Interrupting regeneration can result in low quality water or even brine being fed into the water supply!

Use this function in emergencies only and dump at least twice the resin volume in water afterwards!

Where regeneration is interrupted after brine intake phase "C2", check the brine level in the container and fill up where necessary!

### Min. rinse water volumes for interrupted regeneration:

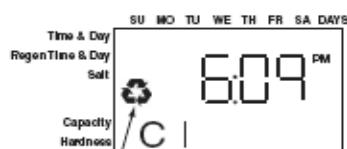
Model JM	2 WZ-E	3 WZ-E	4 WZ-E	6 WZ-E
Min. volumes [ltr.]	40	60	100	150



### 7.3.3 Manual Regeneration

The control unit recognises two options for a manual regeneration start up: Regeneration at the next allocated time is delayed (e.g. 2am) or a regeneration is immediately started.

#### Delayed Regeneration (skip to next allocated time):



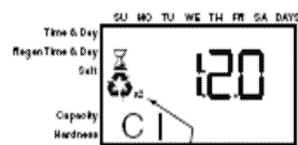
Symbol flashes

Press Regen key once.  
Recycling symbol flashes.  
Press Regen key to abort.

#### Immediate Regeneration:

Hold the Regen key down for 5 seconds. The regeneration symbol appears on the display. The camshaft moves to phase "C1".

#### Immediate double Regeneration (e.g. when shutting unit down):



Second regeneration set

Once the camshaft has moved to phase "C1" at manual start up, a second regeneration can be initiated. Hold the REGEN key down for 5 seconds once the camshaft has started moving into phase "C1". The display now shows "x2", i.e. once this regeneration is complete, a second will be run automatically.



#### Caution

**This key should be used by qualified persons during installation or maintenance only!**

**Misuse may lead to unit malfunction!**

Action	Key	Duration	Display
Skip to next regeneration	Regen	Short	Recycling symbol flashes.
Regeneration stop	Regen	Short when recycling symbol flashes	Recycling symbol switches off.
Immediate regeneration	Regen	5 sec.	Recycling symbol appears.
Immediate double regeneration	Regen	5 sec. regeneration again once cycle starts	x2 symbol appears.



## 7.4 Process level

This level is used to display information and settings used to assist service personnel in maintenance work or when trouble shooting. At process level a small **H** appears in the bottom left corner of the display. Next to this **H** is the number of the process concerned.

### Accessing process level:

Action	Key	Duration	Display
Enter data mode	Down and Ok	5 sec.	H0 value flashes
Move to next stage	Up or Down	Short	Previous or next stage
Restore values	Ok	5 sec.	(Factory) settings restored

Process	Description	Report/Unit
H0	Resin volume	Litre
H1	Days since last regeneration	0-255 days
H2	Current flow rate	Dependent on "P9"
H3	Consumption since last regeneration (today)	0-6553.30m <sup>3</sup>
H4	Consumption since last regeneration	0-6553.30m <sup>3</sup>
H5	Total consumption since last reset (100)	0-6553.30m <sup>3</sup>
H6	Total consumption since last reset (104m <sup>3</sup> )	0-6553.30m <sup>3</sup>
H7	Average consumption (Sundays)	0-6553.30m <sup>3</sup>
H8	Average consumption (Mondays)	0-6553.30m <sup>3</sup>
H9	Average consumption (Tuesdays)	0-6553.30m <sup>3</sup>
H10	Average consumption (Wednesdays)	0-6553.30m <sup>3</sup>
H11	Average consumption (Thursdays)	0-6553.30m <sup>3</sup>
H12	Average consumption (Fridays)	0-6553.30m <sup>3</sup>
H13	Average consumption (Saturdays)	0-6553.30m <sup>3</sup>



### 7.4.1 Setting resin volume

Parameter H0 shows the setting for resin volume of the softening unit.

Hold Ok (■) and Down key (↓) pressed for 5 sec. to enter data mode if the value for H0 is incorrect. Afterwards hold Ok (■) pressed for 5 sec. to restore the values.

Three horizontal lines will be displayed flashing (- - -). With the Up/Down keys (↑/↓) the correct resin volume will be set and stored with Ok (■).



#### Caution

**Resetting the control unit cancels all stored data and returns the unit to factory settings!**

**This function should be used in emergencies only as the control unit must then be completely reprogrammed!**

**Once the control unit has been reset, a regeneration should always be started to synchronise the camshaft, this can be fast forwarded!**



## 8 Initial commissioning

1. Fill water into the brine container (volume see chapter 3.4).
2. Add salt tablets to the container up to approx. 10cm below the edge of the brine marker.



### Note

**Dissolving the salt tablets requires approx. 2 hours. A regeneration can only take place when the tablets are fully dissolved!**

3. Control electrical connections.
4. Open inlet taps slowly.



### Caution

**If the inlet valve is opened too far or too fast, then resin can be washed into the valves or the water supply!**

5. Check min. pressure requirements.
6. Check the hydraulic function manually (no power) by turning the camshaft anti-clockwise through the following functions: Back wash, regeneration media intake, slow wash, fast wash, brine chamber refill.
7. Connect control unit to power supply. The camshaft goes into synchronisation and parameters can now be programmed.
8. Start manual regeneration. Regeneration runs automatically. During the first 5 minutes of regeneration, check the flush water and compare with values as shown in chapter 3.4.
9. Water is filled into the container during the 'brine refill' phase. Once complete, stock up to the values shown in chapter 3.4.
10. Slowly open tap at unit outlet.

Once commissioning is complete, check the values of the softened or mixed water after the unit. If specific values are required, then set these using the automatic mixing valve JAV.

### 8.1 Testing the sodium content

Sodium content testing is only required when the unit is connected to a drinking water supply. The mixing valve is to be set to local requirements and testing is to be done in accordance with the values for sodium content in drinking water valid in the country of use.



## 9 Regeneration intervals

This softening unit is flow rate controlled. This means that a regeneration is started once a given volume of water has passed through the unit.

The intervals between two regenerations are determined by the size of the unit concerned, total water consumption, incoming raw water hardness and, where programmed, the residual hardness required. In cases where raw water hardness fluctuates, please use the highest values.

The interval between two regenerations is calculated as follows:

### 9.1 Volume of softened water

Volume of softened (non-mixed) water between 2 regenerations (WW2R).

$$WW2R = \frac{K}{r} \text{ (m}^3\text{)}$$

K = Capacity in °dH x m<sup>3</sup> or in mol/l x 5,6

r = Raw water hardness in °dH

#### Given:

- e.g. JM 2 WZ-E
- Capacity 60 °dH x m<sup>3</sup>
- Raw water hardness e.g. 20 °dH

#### Task:

Find softened water volume (non-mixed) between 2 regenerations (WW2R).

#### Solution:

$$WW2R = \frac{60^\circ dH}{20^\circ dH} \text{ (m}^3\text{)}$$

$$WW2R = 3 \text{ m}^3$$

Calculations show an available softened water volume of 3m<sup>3</sup>. At a consumption rate of 1m<sup>3</sup>/day, regeneration will start after 3 days at the latest.



## 9.2 Mixed water volume

Mixed water volume between 2 regenerations (MW2R).

$$MW2R = \frac{WW2R \times r}{r - m} \text{ (m}^3\text{)}$$

WW2R = Softened water volume between 2 regenerations non-mixed in m<sup>3</sup> (values see chapter 9.1)

r = Raw water hardness in °dH

m = Mixed water hardness in °dH

### Given:

- e.g. JM 2 WZ-E
- Softened water volume e.g. 3 m<sup>3</sup>
- Raw water hardness e.g. 20 °dH
- Mixed water hardness e.g. 8 °dH

### Task:

Find mixed water volumes between 2 regenerations (MW2R).

### Solution:

$$MW2R = \frac{3\text{m}^3 \times 20^\circ dH}{20^\circ dH - 8^\circ dH} \text{ (m}^3\text{)}$$

$$MW2R = 5 \text{ m}^3$$

Calculations show an available mixed water volume of 5m<sup>3</sup>. At a consumption rate of 1m<sup>3</sup>/day, regeneration will start after 5 days at the latest.



## 10 Commissioning



### Caution

**Settings given for commissioning may need to be varied to meet with actual values on site!**



### Note

**Commissioning should be carried out by persons with the correct qualifications only!**

Once the unit has been connected up to the water supply as described in chapters 4 and 5, it is ready to be commissioned.

The control unit is supplied with factory settings and all that needs to be programmed are the parameters “P3”, “P4”, “P7” and “P8” as these need adjusting to conditions on site and cannot be factory set. Chapters 7.2 and 10.1 contain information on how to make these settings.

Should it be necessary to run a reset at any point, then these values will need reprogramming.

### 10.1 Settings

#### Keys

Access	Forward Backward	Choose	Alter	Store
↓ ■	↓ ↑	■	↑/↓	■

Model JM		2 WZ-E	3 WZ-E	4 WZ-E	6WZ-E
<b>Process level H</b>					
Parameter	Description				
H0	Resin volume	20	30	50	80
<b>Expert level P</b>					
Parameter	Description				
P1	Time	Active time	Active time	Active time	Active time
P2	Weekday	Active weekday	Active weekday	Active weekday	Active weekday
P3	Regeneration time	Dependent on user	Dependent on user	Dependent on user	Dependent on user
P4	Regeneration interval				
P6	Brine value optimal	H	H	H	H
P7	Capacity of the softener unit	(See chapter 10.1.1)	(See chapter 10.1.1)	(See chapter 10.1.1)	(See chapter 10.1.1)
P8	Raw water hardness				
P9	Units	1	1	1	1
P10	Clock mode	1	1	1	1





### 10.1.1 Values required for capacity of the unit (P7) and raw water hardness (P8)

Model JM		2 WZ-E		3 WZ-E		4 WZ-E		6 WZ-E	
Raw water hardness on site [°dH]	Value for raw water hardness [ppm CaCO <sub>3</sub> ]	Value for capacity of the system [kg CaCO <sub>3</sub> ]							
		Brine value optimal	Brine value economy	Brine value optimal	Brine value economy	Brine value optimal	Brine value economy	Brine value optimal	Brine value economy
2	40	1.2	0.9	2.0	1.5	4.0	3.0	6.0	4.5
3	50	1.0	0.7	1.6	1.2	3.3	2.5	5.0	3.7
4	70	1.0	0.7	1.7	1.3	3.5	2.6	5.2	3.9
5	90	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
6	110	1.1	0.8	1.8	1.3	3.6	2.7	5.5	4.1
7	130	1.1	0.8	1.8	1.3	3.7	2.7	5.5	4.1
8	140	1.0	0.7	1.7	1.3	3.5	2.6	5.2	3.9
9	160	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
10	180	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
11	200	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
12	210	1.0	0.7	1.7	1.3	3.5	2.6	5.2	3.9
13	230	1.0	0.8	1.7	1.3	3.5	2.6	5.3	3.9
14	250	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
15	270	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
16	290	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
17	300	1.0	0.7	1.7	1.3	3.5	2.6	5.2	3.9
18	320	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
19	340	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
20	360	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
21	380	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
22	390	1.0	0.8	1.7	1.3	3.5	2.6	5.3	3.9
23	410	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
24	430	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
25	450	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
26	460	1.0	0.8	1.7	1.3	3.5	2.6	5.3	3.9
27	480	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
28	500	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
29	520	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
30	540	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
31	550	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
32	570	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
33	590	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
34	610	1.0	0.8	1.8	1.3	3.5	2.6	5.3	4.0
35	630	1.0	0.8	1.8	1.3	3.6	2.7	5.4	4.0
36	640	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
37	660	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
38	680	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0
39	700	1.0	0.8	1.8	1.3	3.5	2.7	5.3	4.0
40	710	1.0	0.8	1.7	1.3	3.5	2.6	5.3	4.0



## 11 Operation

The control unit is delivered ex factory pre-programmed for the unit concerned. The unit needs programming for factors given on site (regeneration time, regeneration interval and raw water hardness) and is then ready for operation.



### Caution

**Avoid making alterations to the regeneration program manually where possible. This may lead to malfunctions!**

**Alterations should be made by qualified personnel only!**

**Do not override the max. flow rate as this could lead to hard water being fed through the unit!**

### 11.1 Controlling mixed water hardness

We recommend controlling residual hardness in the outgoing water from time to time. Ideal for this purpose is the JUDO total hardness measuring kit type A (see chapter 2.1). It may be necessary to adjust the mixing valve to rebalance.

### 11.2 Salt supply

Although the unit operates fully automatically, it is necessary to fill the unit up with salt tablets regularly. The quality of salt tablets used should be the highest available in the country of use. The brine intake and brine tank refill should be controlled at regular intervals during regeneration.



## 12 Errors

Fault	Cause	Remedy
No softened water after regeneration.	Power supply not connected.	Connect power supply.
	Power off.	Check power supply.
	Electronic shutdown.	Call customer service.
	No salt in the brine tank.	Refill salt tablets and start manual regeneration.
Brine valve does not suck in brine.	Drain line blocked.	Clean drain line.
	Injector blocked.	Clean injector filter screen.
	Wrong injector size.	Change injector.
	Shut off valve closes too soon.	Set control unit short time to "regeneration media intake" (C2), if necessary change shut off valve.
Control unit does not regenerate automatically.	Power supply not connected.	Connect power supply.
	Motor damaged.	Change motor.
	Control unit programmed incorrectly.	Check programming and alter if necessary.
<b>Err 1</b>	Camshaft should be in operation position but control unit cannot determine positioning of camshaft.	Press Up key to reset the control.
<b>Err 3</b>	Camshaft should be in start position but control unit cannot determine positioning of camshaft.	Wait 2 minutes until control is in start position and hour glass in display blinks to indicate motor is running.
	Camshaft is not moving.	Check electrical connection to the motor.
		Check if the optical sensor is positioned and connected correctly.
		Check if the motor is driving the camshaft.
	Camshaft is taking longer than 5 minutes to reach start position.	Check if optical sensor is properly installed.
		Check if camshaft is properly installed, not blocked and not damaged.
		If the motor is continuously on, then the following parts should be changed: Optical sensor, connection cable with plug, motor, control unit.

If the fault cannot be corrected using the information above please contact your local **JUDO customer service** or an authorised specialist company.

### Customer service centre:

**JUDO-Wasseraufbereitung GmbH**

Hohreuschstraße 39-41

D-71364 Winnenden

Phone: +49 (0)1805/692-111\*

Fax: + 49 (0)1805/692-188\*

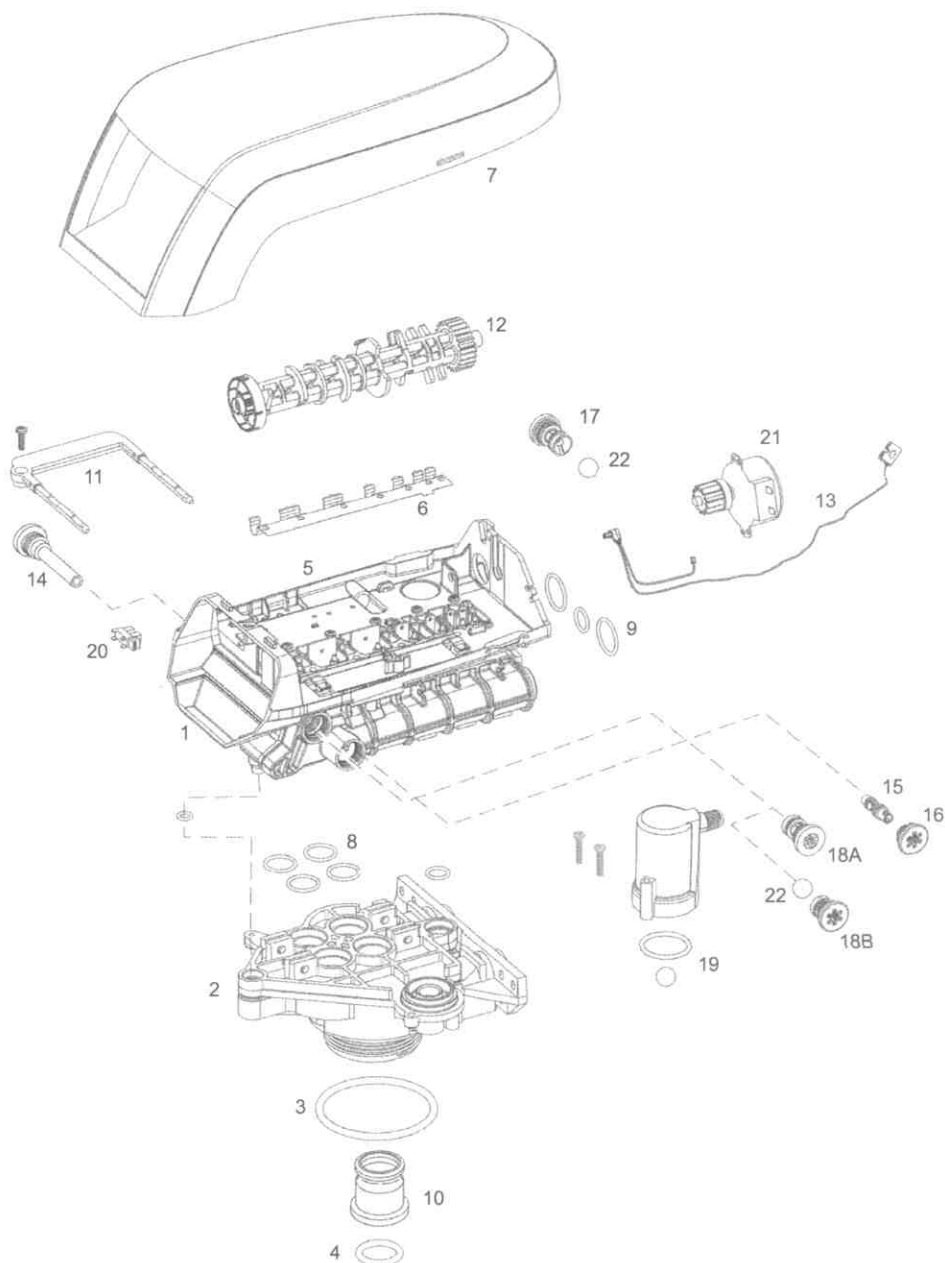
\*14 Cent/min. out of the German landline

### Stamp of installation firm



## 13 Parts

### 13.1 JM 2-3 WZ-E



Date created: 20.05.09

Release date: 05.06.09

Operating instructions: JUDOMAT softening unit JM 2-6 WZ-E

Revision date: 22.06.09

Version: 1.000

In the interests of engineering progress, subject to change without notice!

JUDO Wasseraufbereitung GmbH

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\* 14 Cent/min. out of the German landline



### 13.1.1 Parts list

Pos.	Description	Quantity
1	Assembly group without flow control	1
2	Container adaptors	1
3	O-Ring BN	1
4	O-Ring EP	1*
5	Valve cover	1
6	Single valve spring	1
7	Cover	1
8	O-ring group container adaptor	1
9	O-ring group inlet	1
10	Seal	1*
11	Locking unit	1
12	Camshaft	1
13	Connection cable with plug	1
14	Assembly group screen without O-ring	1
15	Injector	1
16	Injector cover with O-ring	1
17	Drain control assembly with O-ring	1
18A	Brine intake regulator without O-ring	1
18B	Brine intake regulator	1
19	Assembly group check valve	1
20	Optical sensor	1
21	Motor 12VAC/50Hz	1
22	Ball	1

\*Not used!

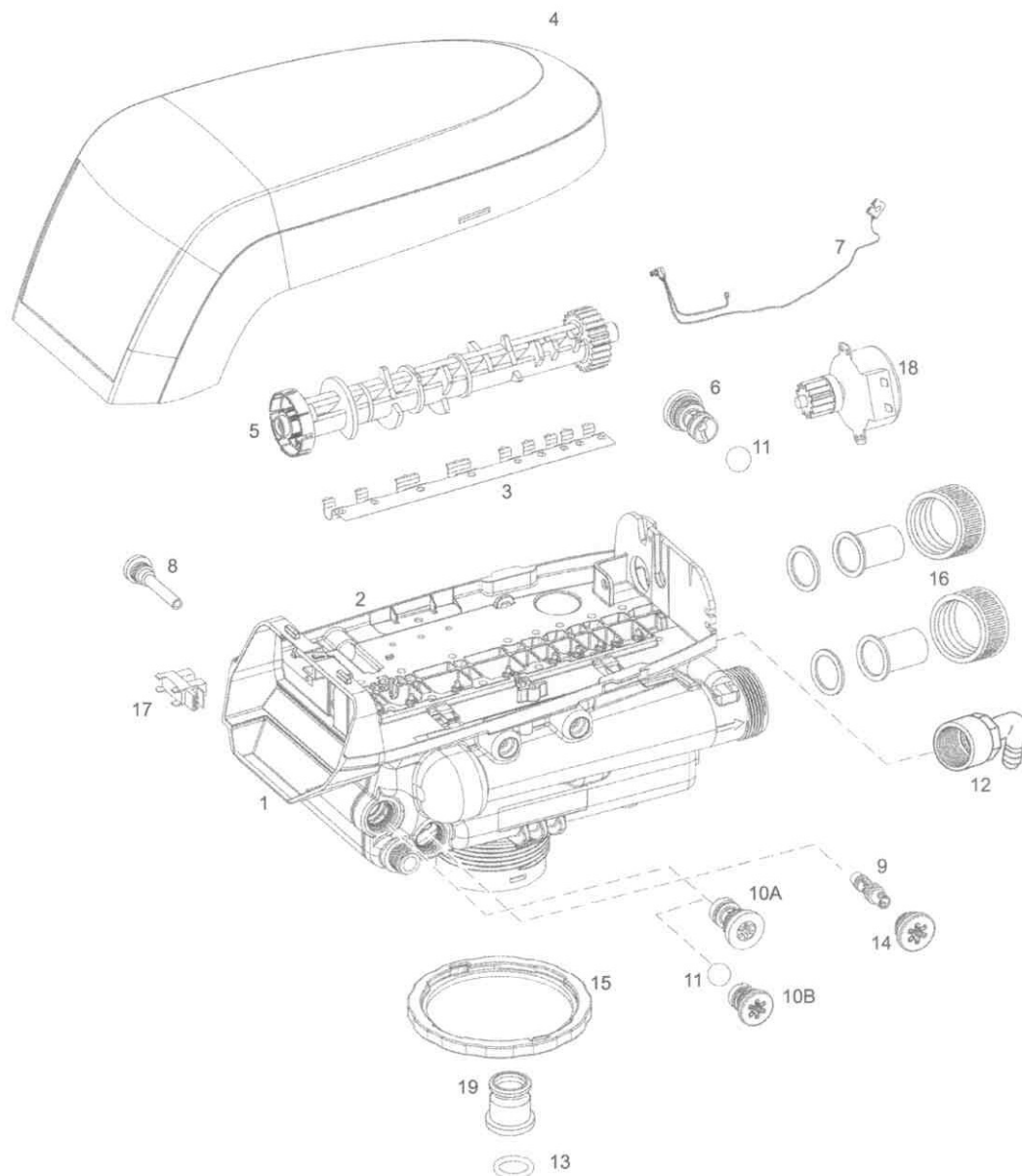
### 13.1.2 Spare parts list

Pos.	Order No.	Description	JM 2 WZ-E	JM 3 WZ-E	Quantity
7	1610576	Cover	X	X	1
13+21	1500370	Connection cable with plug + motor	X	X	1
20	1500371	Optical sensor	X	X	1
12	1980354	Camshaft	X	X	1
1+5	1610567	Assembly group without flow control + valve cover	X		1
	1610568	Assembly group without flow control + valve cover		X	1
15	1980357	Injector G size 8	X		1
	1980359	Injector J size 10		X	1
17	1980363	Drain control assembly with O-ring	X		1
	1980365	Drain control assembly with O-ring		X	1
19	1610367	Assembly group check valve	X	X	1
*	1510168	Control Logix 760	X	X	1
*	1610476	Injector	X	X	1
*	1610484	Brine tube 3/8"	X	X	1,5m
*	1510118	Power supply 230VAC/12VAC	X	X	1

\*Not illustrated!



## 13.2 JM 4-6 WZ-E



Date created: 20.05.09

Release date: 05.06.09

Operating instructions: JUDOMAT softening unit JM 2-6 WZ-E

Revision date: 22.06.09

Version: 1.000

In the interests of engineering progress, subject to change without notice!

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\* 14 Cent/min. out of the German landline



### 13.2.1 Parts list

Pos.	Description	Quantity
1	Assembly group without flow control	1
2	Valve cover	1
3	Single valve spring	1
4	Cover	1
5	Camshaft	1
6	Drain control assembly with O-ring	1
7	Connection cable with plug	1
8	Assembly group screen without O-ring	1
9	Injector	1
10A	Brine intake regulator without O-ring	1
10B	Brine intake regulator	1
11	Ball	1
12	Drain angled section (3/4" tubing, push-on)	1
13	O-Ring	1*
14	Injector cover with O-ring	1
15	Retaining ring for O-ring	1
16	Connection ring valve disk	1
17	Optical sensor	1
18	Motor 12VAC/50Hz	1
19	Seal	1*

\*Not used!

### 13.2.2 Spare parts list

Pos.	Order No.	Description	JM 4 WZ-E	JM 6 WZ-E	Quantity
4	1610576	Cover	X	X	1
7+18	1500370	Connection cable with plug + motor	X	X	1
17	1500371	Optical sensor	X	X	1
5	1980378	Camshaft	X	X	1
1+2	1610569	Assembly group without flow control + valve cover	X		1
	1610570	Assembly group without flow control + valve cover		X	1
9	1980360	Injector K size 12	X		1
	1980361	Injector L size 14		X	1
6	1980366	Drain control assembly with O-ring	X		1
	1980368	Drain control assembly with O-ring		X	1
*	1510168	Control Logix 760	X	X	1
*	1610477	Injector	X	X	1
*	1610484	Brine tube 3/8"	X	X	1,5m
*	1510118	Power supply 230VAC/12VAC	X	X	1

\*Not illustrated!



## 14 Maintenance and inspection

In most countries, regular inspection and maintenance of units used in water treatment is required. We recommend this maintenance be carried out every 6 months or, at the latest, every 12 months. Signing a maintenance contract with your local service agent will ensure this maintenance is done without you having to remember it.

### 14.1 Cleaning

The injector, the brine valve and container should be cleaned at regular intervals in order to remove deposits which have settled there. The correct operation of the brine intake and brine filling functions should be checked regularly during regeneration.

### 14.2 Unit shutdown

If the unit is to be shut down for a longer period, several regeneration cycles should be run through before the unit is switched off. The resin in the unit must be under water for the whole shutdown period. Brine containers should be cleaned. Where installed, dosing pumps following the unit should be shut down too.



#### Caution

**When shut down, there is a danger that heating will lead to expansion in the resin chamber creating a pressure beyond the operational pressure of the unit itself. The unit should, therefore, be depressurised when stored!**